CLAIMS:

1. An exhaust system (10) for a vehicular lean-burn internal combustion engine (12), which system comprising a catalyst (18) for reducing NO_x in exhaust gas to N_2 with a suitable reductant, a source of reductant, means (20) for contacting the catalyst (18) with the reductant, means (TC1) for sensing the temperature of the exhaust gas and/or the catalyst bed and means, when in use, for controlling reductant addition, wherein the reductant addition control means supplies an amount of reductant to the catalyst at a rate corresponding to a measured temperature value of the exhaust gas and/or catalyst bed, which temperature value has been pre-determined to correlate, in use, with an amount of NO_x in the exhaust gas thereby to promote the reduction of the NO_x.

2. A method of calibrating a rate of reductant addition required to reduce NO_x in an exhaust gas of a vehicular lean-burn internal combustion engine (12) to N_2 over a suitable catalyst (18), which method comprising measuring NO_x in the exhaust gas at a plurality of exhaust gas and/or catalyst bed temperatures and correlating each exhaust gas and/or catalyst bed temperature value with a rate of reductant addition required to reduce the NO_x over the catalyst.

3. An exhaust system (30; 40) for a vehicular lean-burn internal combustion engine (12), which system comprising a catalyst (18; 42; 42A) for reducing NO_x in exhaust gas to N_2 with a suitable reductant, a source of reductant, means (20) for contacting the NO_x reduction catalyst (18; 42; 42A) with the reductant, an oxidation catalyst (32) disposed downstream of the NO_x reduction catalyst (18; 42; 42A), means (TC1, TC2) for determining a temperature difference (ΔT) across the oxidation catalyst (32) and means, when in use, for controlling reductant addition, wherein the reductant addition control means controls the rate of reductant addition to maintain ΔT within a pre-determined range, wherein the system is configured so that the exhaust gas composition over the oxidation catalyst is lean.

4. A method of controlling, by feedback, addition of reductant to a catalyst (18; 42; 42A) for reducing NO_x in an exhaust gas of a vehicular lean-burn internal combustion

engine (12) to N_2, which method comprising providing an oxidation catalyst (32) for oxidising the reductant downstream of the NO_x reduction catalyst (18; 42; 42A), measuring the exhaust gas temperature upstream of the oxidation catalyst (32), measuring the exhaust gas temperature downstream of the oxidation catalyst (32), determining the difference between the inlet and the outlet temperatures (ΔT) and adjusting the rate of reductant addition so that ΔT is within a pre-determined range.

5. An exhaust system for a vehicular lean-burn internal combustion engine comprising a NO_x-trap (42A; 131) disposed on a unitary monolith substrate, the upstream end of which substrate is subdivided in the direction of fluid flow into at least two zones (45; 131X,131Y) and means for successively contacting a fraction of the at least two zones (45; 131X,131Y) with a reductant whilst the NO_x-trap (42A; 131)as a whole remains in-line to exhaust gas flow.

6. An exhaust system according to claim 5, wherein the means for contacting the NO_x-trap fraction with reductant comprises an injector (20; 132X,132Y) disposed sufficiently close to the upstream end of the substrate so that droplets of liquid reductant contact the NO_x-trap.

7. An exhaust system according to claim 6, wherein the substrate comprises a ceramic or metal foam.

8. An exhaust system according to claim 5, wherein the means for contacting the NO_x-trap fraction with reductant comprises a flap valve (128) disposed at the upstream end of the substrate thereby to subdivide the substrate into the at least two zones (131X,131Y).

9. An exhaust system according to claim 8, comprising an injector (132X,132Y) associated with each zone.

10. A method of regenerating a NO_x-trap (42A; 131) disposed on a monolith substrate in the exhaust system of a vehicular lean-burn internal combustion engine,

which method comprising contacting a fraction (45; 131X,131Y) of the NO_x-trap with a reductant while the NO_x-trap as a whole remains in-line to exhaust gas flow.

11. A method according to claim 10, wherein the fraction of the NO_x-trap is contacted with droplets of liquid reductant.

12. A method according to claim 10, wherein the reductant contacts the fraction of the NO_x-trap at reduced exhaust gas flow.

13. An exhaust system for a vehicular lean-burn internal combustion engine comprising a NO_x reduction catalyst, a reductant injector (68) disposed upstream of the catalyst and means (50), when in use, for controlling reductant addition, wherein the reductant addition control means supplies reductant to the catalyst at a rate which is predetermined to correlate with a desired NO_x conversion at the average duty cycle speed of the vehicle at all vehicle speeds in a duty cycle.

14. An exhaust system according to claim 13, comprising an oxidation catalyst disposed between the reductant injector (68) and the NO_x reduction catalyst.

15. A method of reducing NO_x in the exhaust gas of a vehicular internal combustion engine, which method comprising introducing a reductant into the exhaust gas, at all vehicle speeds in a duty cycle, at a rate correlating with a desired NO_x conversion at the average duty cycle speed and contacting the exhaust gas containing the NO_x and the reductant with a NO_x reduction catalyst.

16. A method according to claim 15, comprising contacting the reductant with an oxidation catalyst upstream of the NO_x reduction catalyst thereby to increase the temperature of the exhaust gas and/or to reduce the oxygen concentration in the exhaust gas.

17. An exhaust system according to any of claims 1, 3, 5 to 9, 13 or 14, comprising control means, when in use, to supply reductant to the NO_x reduction catalyst only when the NO_x reduction catalyst is active.

18. A method according to any of claims 2, 4, 10 to 12, 15 or 16, wherein reductant is supplied to the NO_x reduction catalyst only when it is active for catalysing NO_x reduction.

19. An exhaust system according to claim 3, wherein the rate of reductant addition is decreased if ΔT is too large.

20. A method according to claim 4, wherein the rate of reductant addition is decreased if ΔT is too large.

21. An exhaust system according to claim 1, 3, 5 to 9, 13, 14 or 17, wherein the reductant is a hydrocarbon and the catalyst is a lean-NO_x catalyst.

22. An exhaust system according to claim 1, 3, 5 to 9, 13, 14 or 17, wherein the reductant is a NO_x-specific reactant and the catalyst is a selective catalytic reduction (SCR) catalyst.

23. An exhaust system according to claim 21 or 22, wherein the catalyst comprises a NO_x-absorbent.

24. A method according to claim 2, 4, 10 to 12, 15, 16 or 18, wherein the reductant is a hydrocarbon and the catalyst is a lean-NO_x catalyst.

25. A method according to claim 2, 4, 10 to 12, 15, 16 or 18, wherein the reductant is a NO_x-specific reactant and the catalyst is a selective catalytic reduction (SCR) catalyst.

26. A method according to claim 24 or 25, wherein the catalyst comprises a NO_x-absorbent.